

How to Build a House

House construction pictorially presented, with all essential details, including rafter tables, bridging tables, nailing schedule, etc.

For

The Home Owner - Builder

By

EVERETT S. OWENS

Author of

Builder's Pocket Manual for Estimating House Construction.

See your lumberman first. Plan to make him a part of your plans. He can save you money and mistakes.

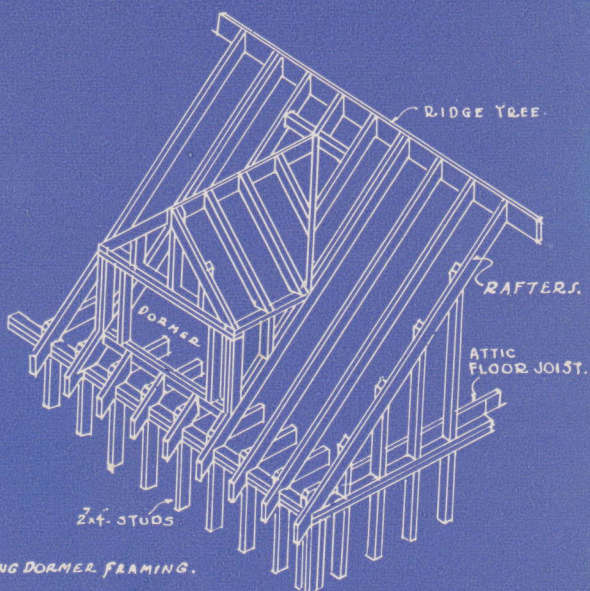
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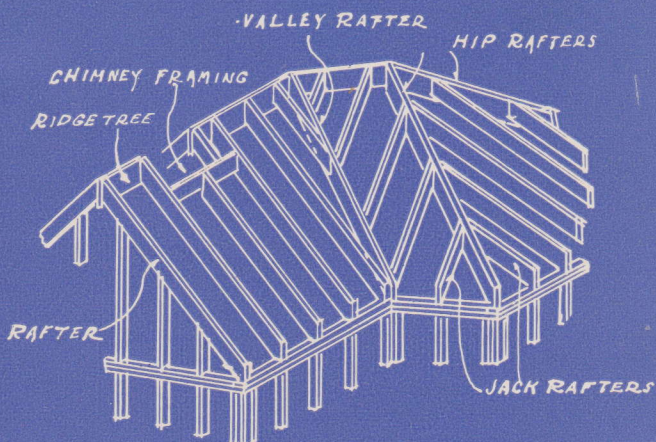
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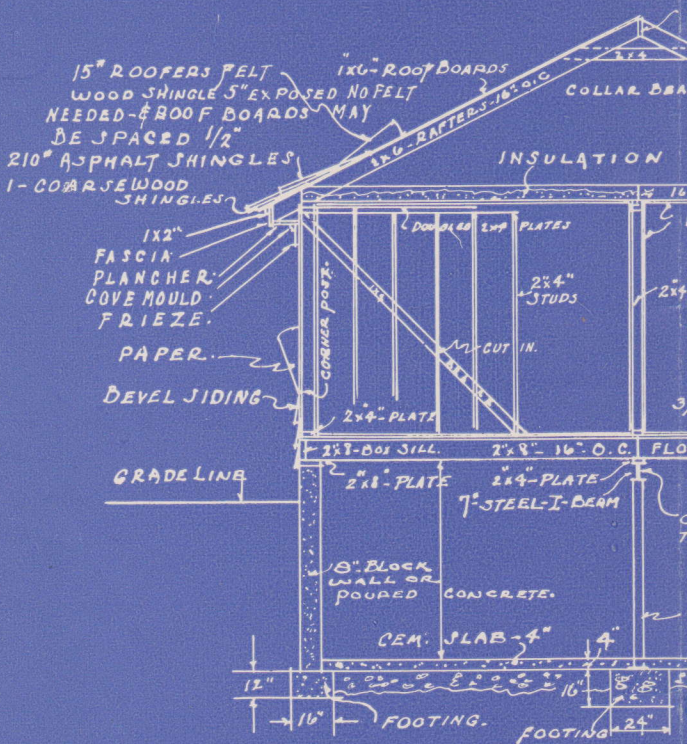
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· SHOWING DORMER FRAMING ·

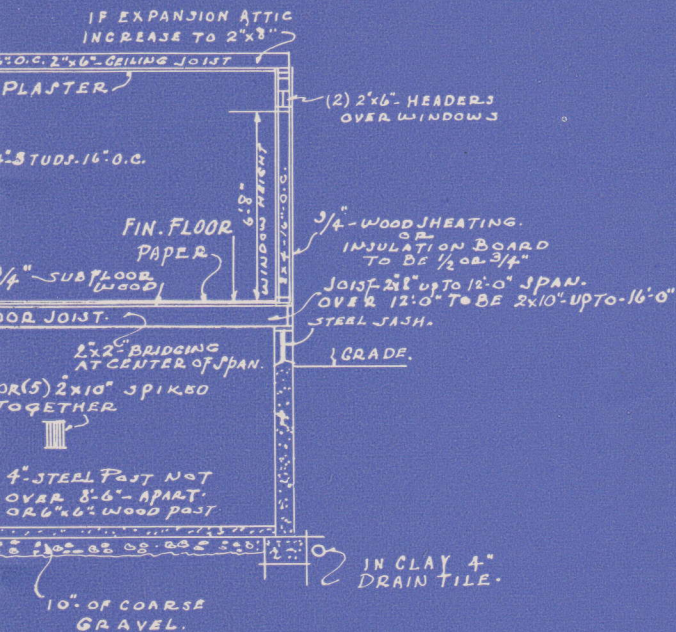


· SHOWING ROOF CONSTRUCTION ·

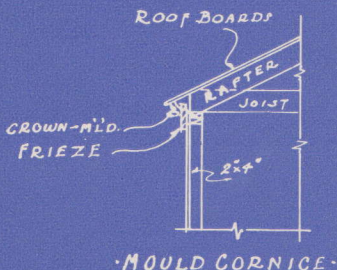
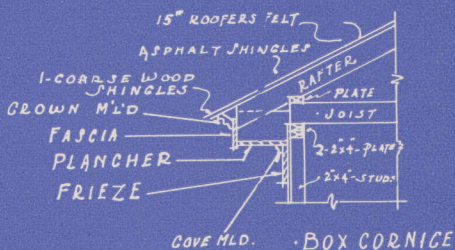
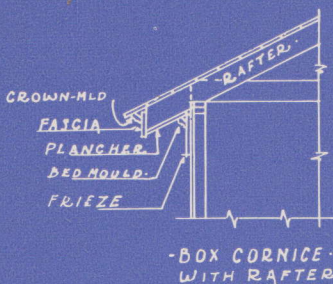
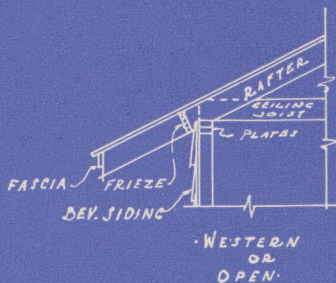


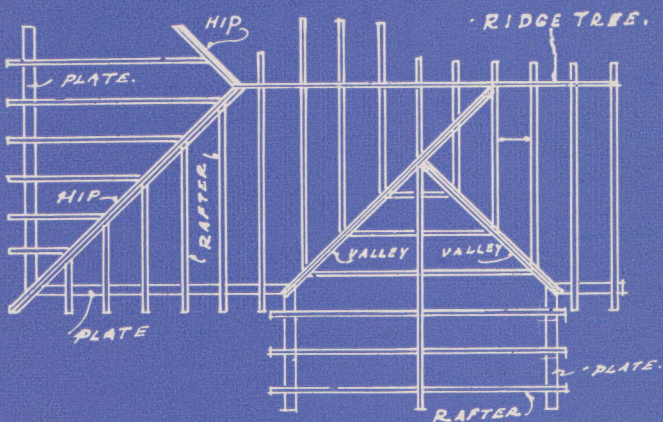
Typical Section

RIDGE TREE



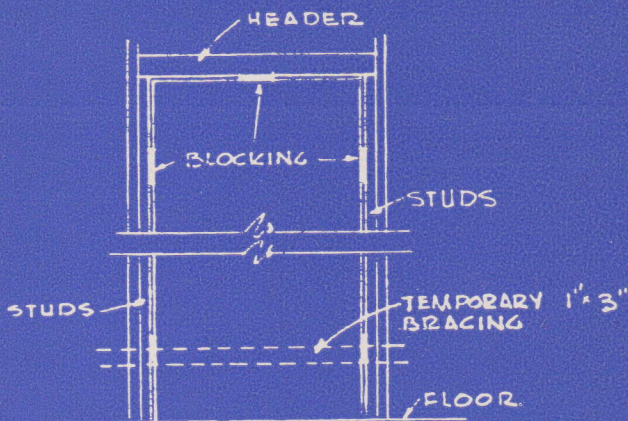
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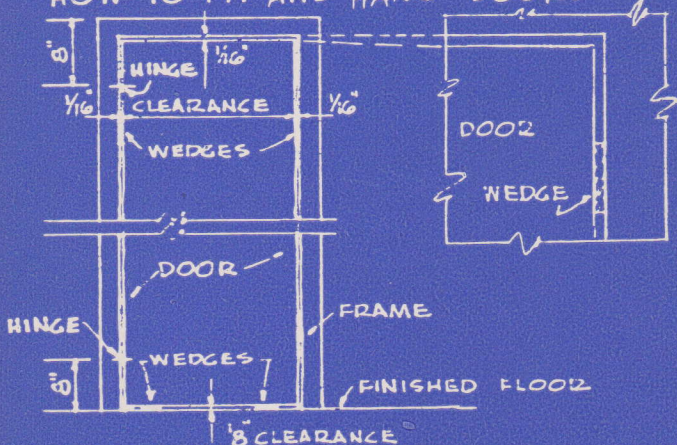
· FRAMING PLAN ·

HOW TO SET DOOR FRAMES



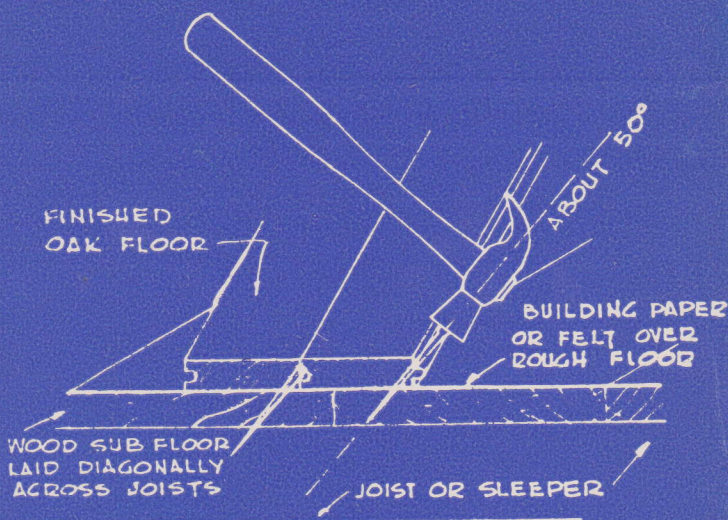
Frame your door opening slightly larger than size of door plus 7/8" jambs on each side and 7/8" header. Door frame will come cut approximately size of your opening. Put in header and nail temporary spreader near bottom of frame plumbing the jambs and leveling the header. This will leave slight space between jambs and header and the door framing. Place blocking as indicated above, (Shingle Butts make good blocking). Nail Jambs through the blocking into studs.

HOW TO FIT AND HANG DOORS



Fit door to frame, allow a 1/16" at top and each side. If threshold mark the door to fit thickness of threshold, and allow 1/8" clearance at bottom of door. After marking door plane until it fits side of frame it will be hung to. Plane top and bottom till door fits frame with the clearances as above shown. Place door on horses and mark for hinges. Place door on edge on the floor, lay hinges in place and scribe on edge of door outline of hinge. Make the same layout on door jamb.

HOW TO LAY TONGUE AND GROOVED FINISHED FLOORING



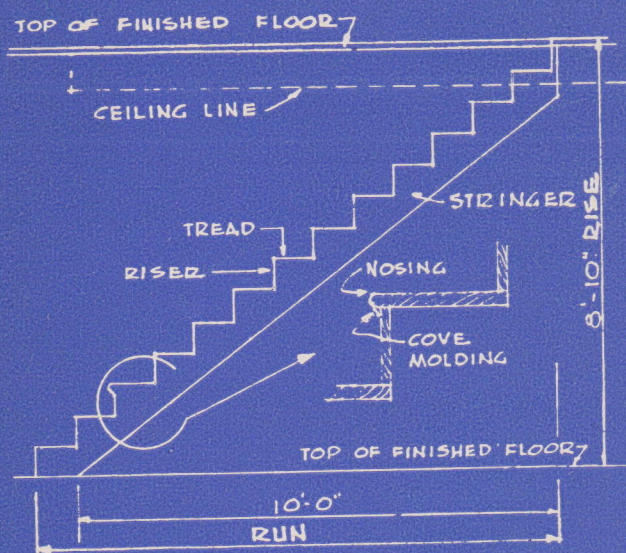
Finish floors should be laid after most of work and painting has been done.

Begin finish floor about 1/4" from and paralleling the wall of the room, by striking a line, tack and sight first course. If accurate nail securely. First course should be face nailed along edge nearest wall so that shoe mold will cover. Watch to see that driving the next two or three courses does not change the first course. Thereafter check several times to see that you are maintaining a straight line. All flooring should be nailed at about a 45 degree angle at the top of the tongue. Don't try to pull flooring up tight by nailing or hitting the tongue. Use a short piece of the same kind of flooring as a block to drive flooring up tight.

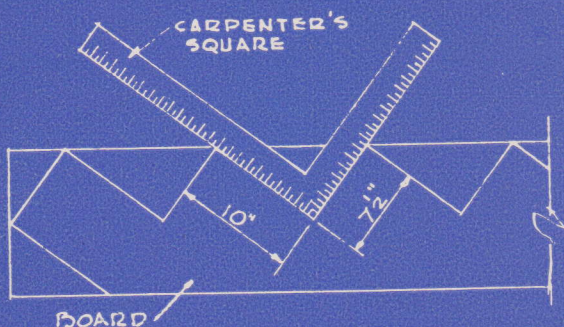
A 15lb. felt or manila paper should be placed between the sub-floor and the finish flooring. Where tile or composition floors are used, the sub-floor should be nailed down as evenly as possible and an underlayment of 5/8" plywood (cheap grade) laid over the sub-floor, well nailed. Uneven spots should be sanded down. Then, tile, linoleum, etc. is laid according to Manufacturers' directions.

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STANDARD STAIR PROFILE



METHOD FOR CUTTING OUT STRINGERS



The above diagram shows how to cut stringers for risers and treads.

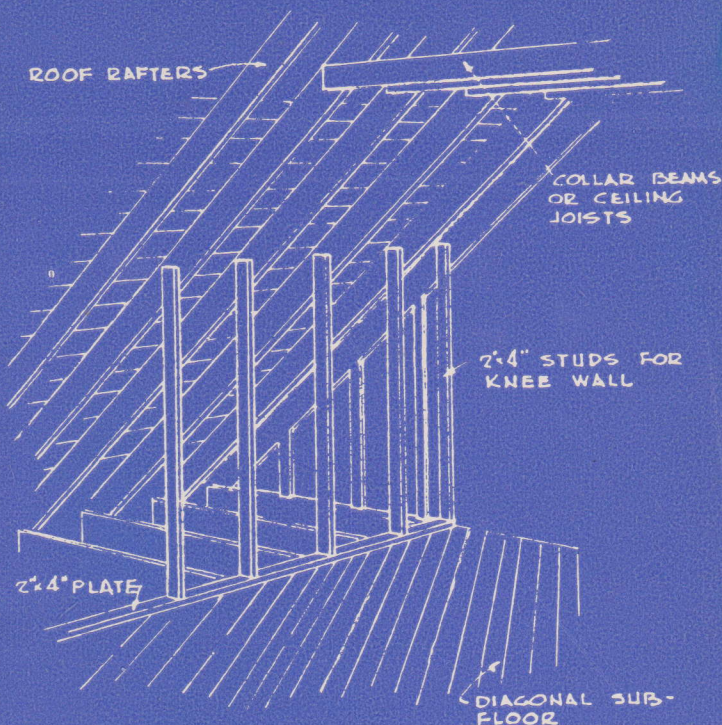
Place square on stringers as shown. If tread is 10" and riser 7" the 10" mark on the blade and the 7" mark on the tongue must come at the edge of stringer. A mark is made on outside edge of blade and tongue and cut out. Continue until all riser and tread cuts on stringers are made.

STANDARD BOX TYPE STAIRS

The average stairs should be 37" wide. The above drawing will show how to estimate number of risers and treads and how long stringers will be.

Number of treads is always one less than the number of risers. The depth of the tread multiplied by the number of treads gives the run of the stairs from face of first bottom riser to last riser at top. Take height of rise, reduce to inches and divide by height of riser and this will give number of risers required in your stairs.

HOW TO FINISH OFF ATTIC

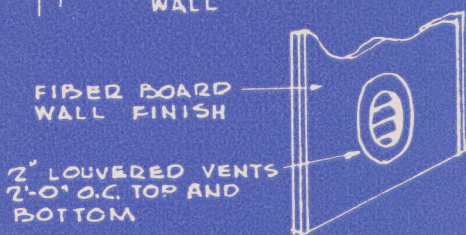
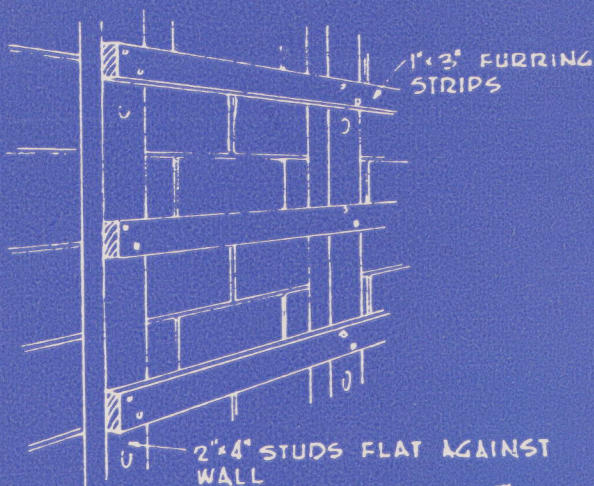


NO. 1 Sketch a rough floor plan size of space to be finished. Show windows, doors, walls etc. Take this to your building material dealer and he will make you a list of materials you will need and give you price for same.

NO. 2 Have needed plumbing, heating ducts and Electric work roughed in.

NO. 3 Lay sub-floor (if none) and nail securely to prevent future squeaks. 1 x 6 boards will make a good sub-floor. Put down the 2 x 4 sole plates where walls-go. Put in 2 x 4 knee wall studs, toe nailing the bottom studs to top of sole plate and nail top of studs to the side of roof rafter. Be sure and see that all studs are exactly in line. Next put up ceiling rafters using 2 x 4 the bottom of the rafters to be placed 7' 6" from the top of floor and nailed to the roof rafters as shown above. If roof rafters are more than 16" apart, install false rafters where needed. Nail both knee wall studs and ceiling rafters to the same side of roof rafters. Put in screened louvers at apex of roof in each gable. Install insulation according to directions and details of the Manufacturer of the brand you use. Some wall and ceiling boards require 1 x 3 furring on studs and ceiling rafters usually placed from 12" to 16" on center. Some brands you can apply directly to studs and ceiling rafters. The makers of the type board you use will furnish full details as to its application. Knee walls should not be less than 4' high. Finish floor, if wood should be laid as described elsewhere herein. Other types of finish floors Manufacturer will furnish you full instructions for laying.

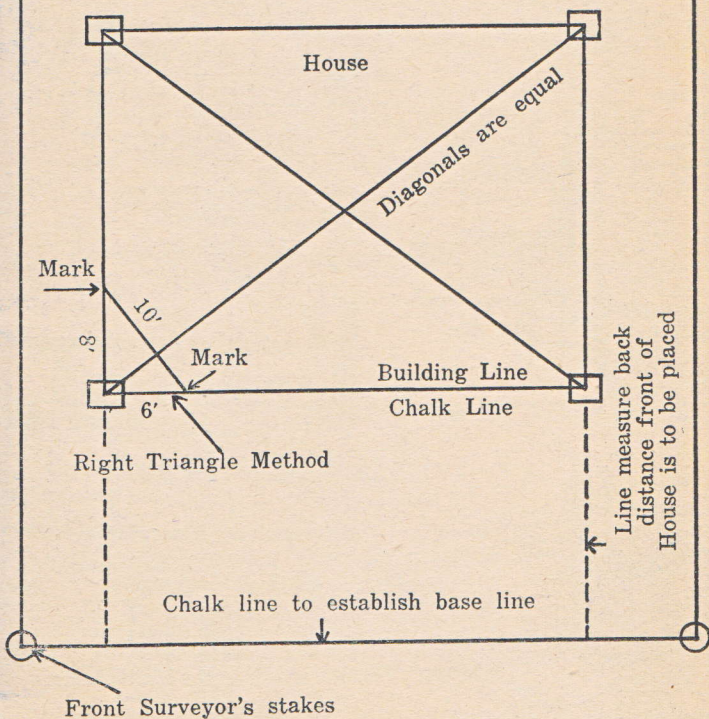
FRAMING FOR BASEMENT



Nail the flat wide side of 2 x 4 studs to the foundation wall on 2' center, using concrete nails as shown in above drawing. Then nail 1 x 3 furring to studs as above shown. You will need ventilation behind your finished wall. This can be achieved by placing regular vent louvers at top and bottom of wall, spacing about 8 feet apart, or a small 2" round louvered vents placed at top and bottom of wall about 2' apart. All other walls in basement are framed same as attic walls. The Manufacturer of type of wall board and flooring you use will furnish you complete details how it should be applied.

— Lot —

HOW TO LAY OUT A HOUSE

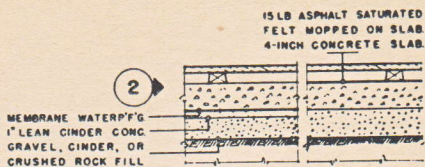
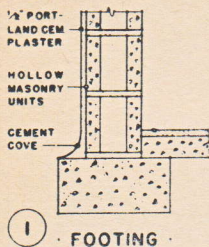


Have lot surveyed with permanent stakes placed at each corner. By using the right-triangle method, which works on the principle that a triangle with sides, 6, 8 and 10 ft. long is a right triangle, you can establish the corners of your house.

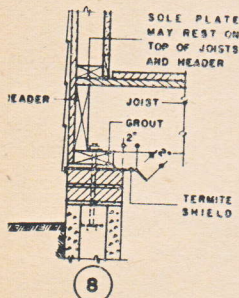
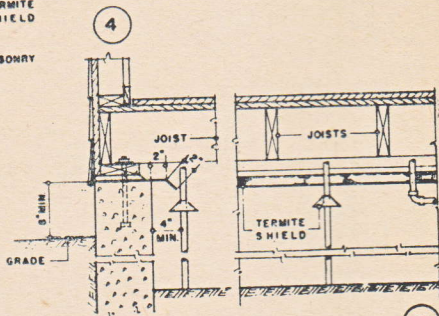
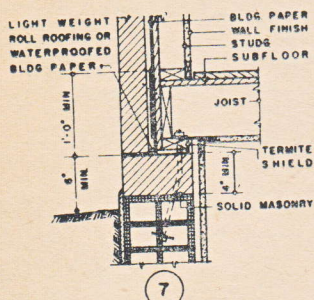
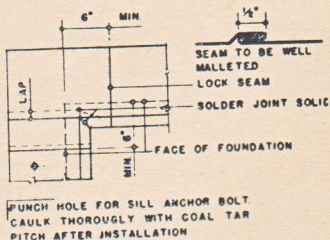
Use the two front surveyor's stakes as a base line in locating the house squarely on the lot. Measure in from the base line an equal distance and drive the two front corner stakes of the house the width as shown by your plans and drive a nail in the top of each stake. Check the height with line level or straightedge. Next, the two rear stakes are set the distance apart as per your plans. Then apply the 6, 8 and 10 ft. measurements, moving the stakes until they coincide. You can prove this by stringing chalk lines diagonally from the four corners. If correct, diagonals will be equal.

(Many localities require that you align your house with houses on adjacent property.)

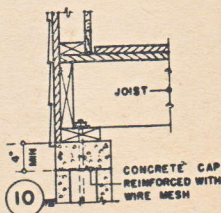
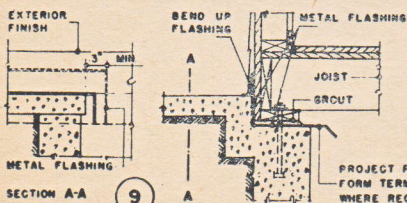
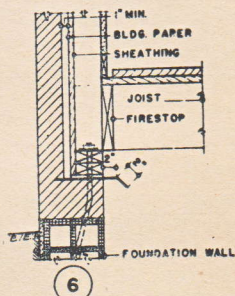
F. H. A. SUGGESTED CONSTRUCTION DETAILS



WOOD FLOOR OVER SLAB ON GROUND



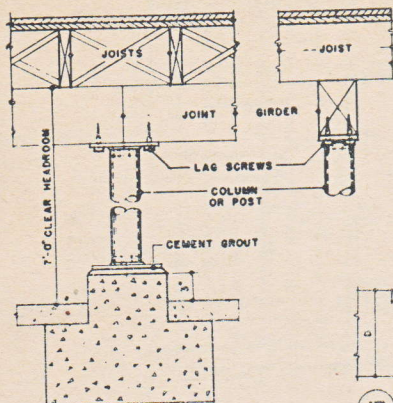
SHIELD DETAILS TERMITE



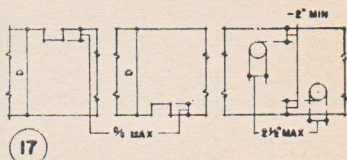
FLASHING AT FILLED PORCH OR TERRACE

SILL CONSTRUCTION

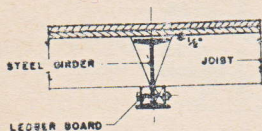
F. H. A. SUGGESTED CONSTRUCTION DETAILS



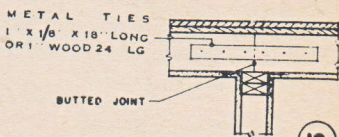
COLUMN FRAMING (11)



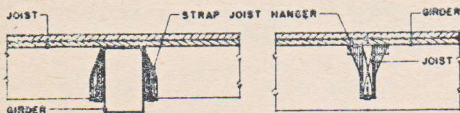
CUTTING JOISTS FOR PIPING



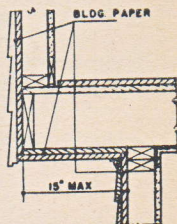
JOISTS FRAMING ON BOTTOM FLANGE OF STEEL GIRDER



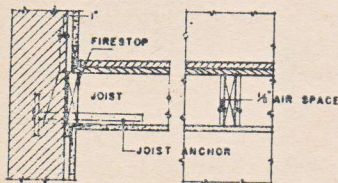
JOIST TIE AT BUTTED JOINT



(13) METAL JOIST HANGER

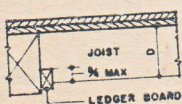


(19)

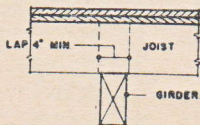


JOISTS FRAMING INTO MASONRY WALLS

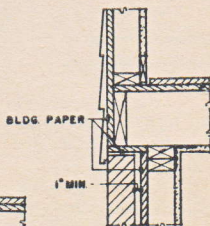
(14)



JOIST FRAMING INTO GIRDERS, HEADERS, & TRIMMERS



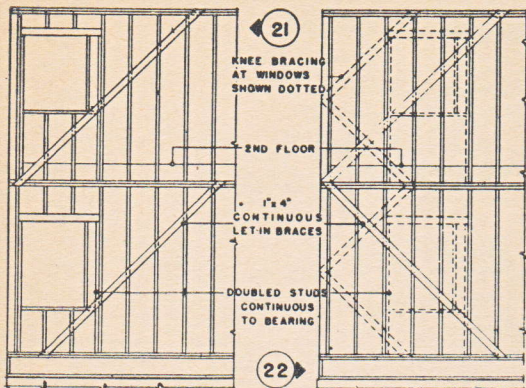
JOIST LAP OVER GIRDER



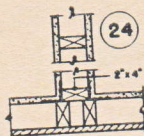
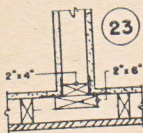
CANTILEVERED OVERHANG

(20)

F. H. A. SUGGESTED CONSTRUCTION DETAILS

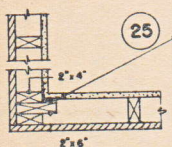


ELEVATION OF CORNER BRACING

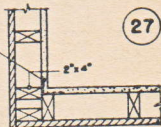
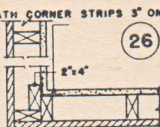


PARTITION CORNER

PARTITION CORNER



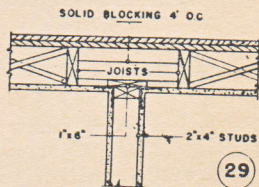
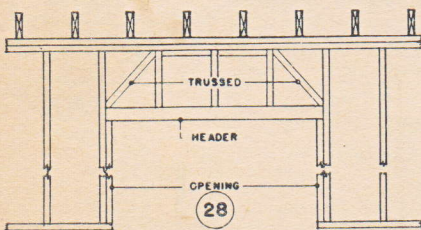
5" METAL LATH CORNER STRIPS 3" ON EACH SIDE



CORNER POST

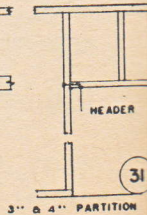
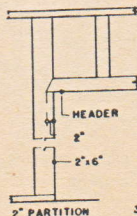
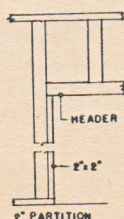
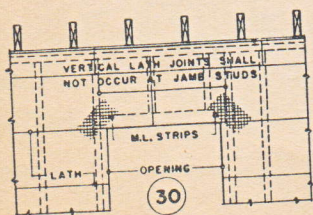
CORNER POST

CORNER POST



TRUSSED HEADER FOR WIDE OPENINGS

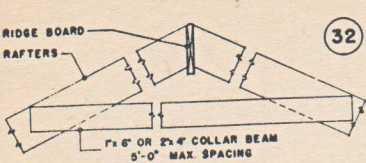
NONBEARING PARTITION PARALLEL TO CEILING JOISTS



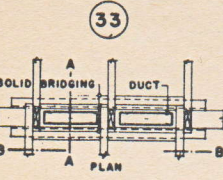
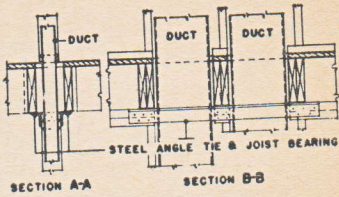
BOARD LATH JOINTING AT HEAD OF OPENING

FRAMING OF OPENINGS IN NONBEARING PARTITIONS

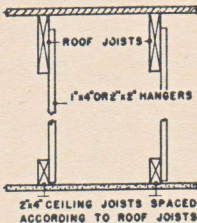
F. H. A. SUGGESTED CONSTRUCTION DETAILS



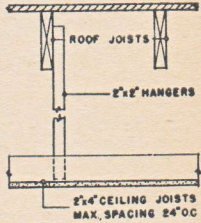
32 · RIDGE · BOARD · AND · COLLAR · BEAM ·



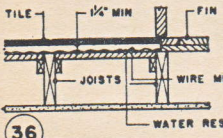
33 · JOIST · BEARING · AND ·
· PLATE · REINFORCING ·



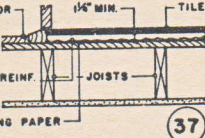
34 · HUNG · CEILING · FRAMING ·



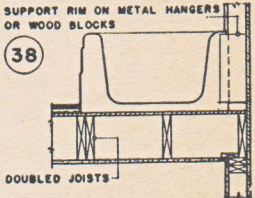
35



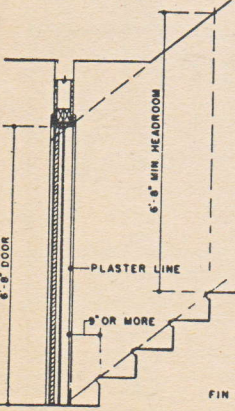
36 · TILE · FLOOR · ON · WOOD · CONSTRUCTION ·



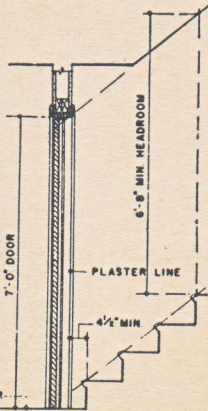
37



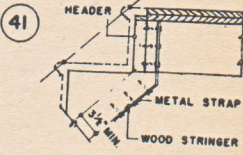
38 · BATH · TUB · SUPPORT ·



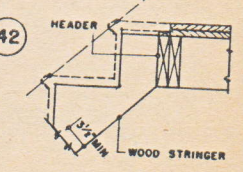
39 · HEADROOM · AT · DOOR · NEAR ·
· FOOT · OF · MAIN · STAIRS ·



40 · STRINGER · FRAMING ·
· AT · HEAD · OF · STAIRS ·

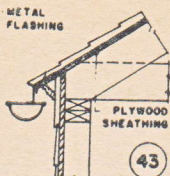


41 · STRINGER · FRAMING ·
· AT · HEAD · OF · STAIRS ·

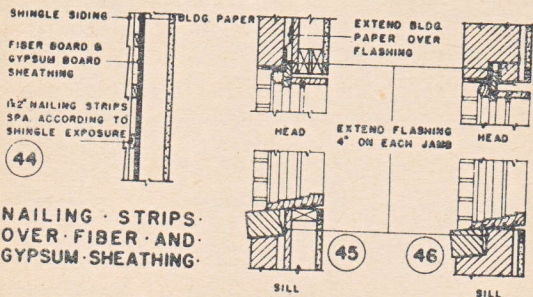


42 · STRINGER · FRAMING ·
· AT · HEAD · OF · STAIRS ·

F. H. A. SUGGESTED CONSTRUCTION DETAILS

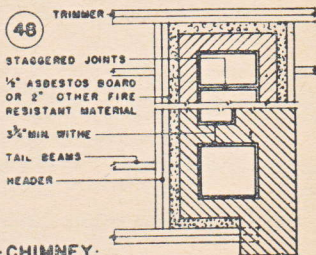
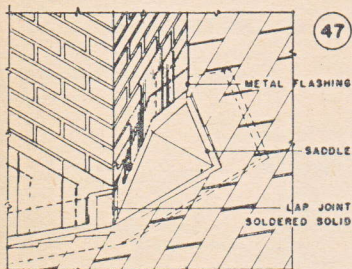


PLYWOOD SHEATHING EAVE DETAIL



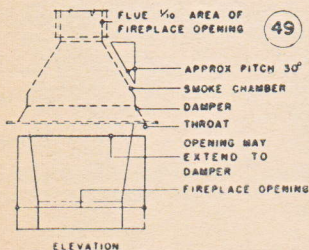
NAILING STRIPS OVER FIBER AND GYPSUM SHEATHING

WINDOW FLASHING

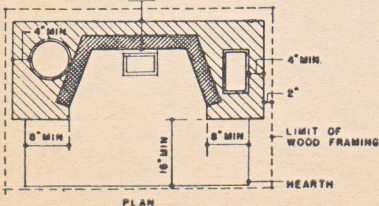


CHIMNEY SADDLE & FLASHING

CHIMNEY



8" MIN-12" RECOMMENDED IF OUTSIDE WALL



Bridging

The following table will be found useful when estimating quantities of bridging and length in which to cut. It gives the length per set (two pieces), and the length of each piece after cutting bevel ready for use for different depth joist, placed 12 and 16 inches on centers. It also gives the bevel cut by the steel square, sizes of bridging 1 inch counted $\frac{7}{8}$ inch; 2 inch counted $1\frac{3}{4}$ inches; joist counted $\frac{3}{8}$ inch scant the full depth; 2 inch joist counted surfaced one side and edge to the standard thickness, $1\frac{5}{8}$ inches; 3 inch joist counted $2\frac{3}{4}$ inches thick. If joist vary from this thickness, increase or diminish the length of bridging, the bevel remaining the same. The bridging is figured to be nailed flush with top edge and about $\frac{3}{8}$ inch inside bottom edge of joists. Bridging used: 1 x 2, 1 x 3, 2 x 2 or 2 x 3.

Table

	Thick- ness and Depth of Joist	Distance on Centers	Length Per Set— Two Pieces	Length One Piece	Bevel on Square		Distance on Centers	Length Per Set— Two Pieces	Length One Piece	Bevel on Square	
					Tongue	Blade				Tongue	Blade
1-INCH BRIDGING	2x 6	12"	1'-10 $\frac{1}{4}$ "	0'-11 $\frac{1}{8}$ "	5"	9 $\frac{3}{4}$ "	16"	2'- 6"	1'- 3 "	5"	14"
	2x 8	12	2- 0	1- 0	5	6 $\frac{3}{4}$ "	16	2- 7 $\frac{1}{4}$	1- 3 $\frac{5}{8}$	5	9 $\frac{1}{8}$
	2x10	12	2- 2	1- 1	9	10	16	2- 9	1- 4 $\frac{1}{2}$	9	13 $\frac{3}{4}$
	2x12	12	2- 4 $\frac{3}{4}$	1- 2 $\frac{3}{8}$	9	8 $\frac{1}{8}$ "	16	2-11	1- 5 $\frac{1}{2}$	9	11 $\frac{1}{8}$
	2x14	12	2- 7 $\frac{1}{2}$	1- 3 $\frac{3}{4}$	9	6 $\frac{3}{8}$ "	16	3- 1 $\frac{1}{4}$	1- 6 $\frac{3}{8}$	9	9 $\frac{1}{8}$
	2x16	12	2-10	1- 5	9	5 $\frac{1}{2}$ "	16	3- 3 $\frac{3}{4}$	1- 7 $\frac{5}{8}$	9	8 $\frac{1}{2}$
	3x12	12	2- 3	1- 1 $\frac{1}{2}$	9	7 $\frac{1}{8}$ "	16	2- 9 $\frac{1}{4}$	1- 4 $\frac{5}{8}$	9	10 $\frac{1}{8}$
	3x14	12	2- 5 $\frac{3}{4}$	1- 2 $\frac{7}{8}$	9	5 $\frac{7}{8}$ "	16	2-11 $\frac{3}{4}$	1- 5 $\frac{7}{8}$	9	8 $\frac{1}{2}$
	3x16	12	2- 8 $\frac{3}{4}$	1- 4 $\frac{3}{8}$	9	5	16	3- 2 $\frac{1}{4}$	1- 7 $\frac{1}{8}$	9	7 $\frac{1}{2}$
2-INCH BRIDGING	2x 6	12"	1'- 9 $\frac{3}{4}$ "	0'-10 $\frac{7}{8}$ "	5"	9 $\frac{7}{8}$ "	16"	2'- 5 $\frac{1}{2}$ "	1'- 2 $\frac{3}{4}$ "	5"	13 "
	2x 8	12	1-11	0-11 $\frac{1}{2}$	5	6	16	2- 6 $\frac{3}{4}$	1- 3 $\frac{3}{8}$	5	8 $\frac{1}{2}$
	2x10	12	2- 1	1- 0 $\frac{1}{2}$	9	10	16	2- 8 $\frac{1}{4}$	1- 4 $\frac{1}{8}$	9	13 $\frac{7}{8}$
	2x12	12"	2- 3 $\frac{1}{4}$	1- 1 $\frac{5}{8}$	9	7 $\frac{5}{8}$ "	16	2-11	1- 5 $\frac{1}{2}$	9	12
	2x14	12	2- 5 $\frac{1}{2}$	1- 2 $\frac{5}{8}$	9	6 $\frac{1}{2}$ "	16	3- 0 $\frac{1}{4}$	1- 6 $\frac{1}{8}$	9	8 $\frac{7}{8}$
	2x16	12	2- 8 $\frac{1}{2}$	1- 4 $\frac{1}{4}$	9	5 $\frac{1}{4}$ "	16	3- 2 $\frac{1}{2}$	1- 7 $\frac{1}{4}$	9	7 $\frac{3}{8}$
	3x12	12	2- 1 $\frac{1}{2}$	1- 0 $\frac{3}{4}$	9	7	16	2- 8 $\frac{1}{4}$	1- 4 $\frac{1}{8}$	9	9 $\frac{7}{8}$
	3x14	12	2- 4	1- 2	9	5 $\frac{1}{2}$ "	16	2-10 $\frac{1}{4}$	1- 5 $\frac{1}{4}$	9	8
	3x16	12	2- 6 $\frac{3}{4}$	1- 3 $\frac{3}{8}$	9	4 $\frac{1}{2}$ "	16	3- 0 $\frac{3}{4}$	1- 6 $\frac{3}{8}$	9	6 $\frac{7}{8}$

Nailing Schedule. Use common or smooth box nails.

Joist to sill or girder, toe nail.....	3-16d
Bridging to joist, toe nail each end.....	2-8d
1x6 subfloor to joist, face nail.....	2-8d
1x8 subfloor to joist, face nail.....	3-8d
2-inch subfloor to joist or girder.....	2-16d
Sole plate to joist or blocking, 16" O. C.....	16d
Top plate to stud, end nail.....	2-16d
Stud to sole plate, toe nail.....	3-16d
Doubled studs 30" O. C. One.....	16d
Top plates spiked together Naid 24" O. C.....	16d
laps and intersections.....	3-16d
Ceiling joists, to plate, toe nail.....	2-16d
laps over partitions.....	3-16d
to parallel alternate rafters.....	3-16d
Rafter to plate.....	3-16d
1-inch brace to each stud and plate.....	2-8d
1x8 sheathing, or less, to bearing.....	2-8d
Over 1x8 sheathing, to bearing.....	3-8d
Corner studs and angles — nail 30" O. C.....	16d
Other joints nail to provide proportionate strength.	

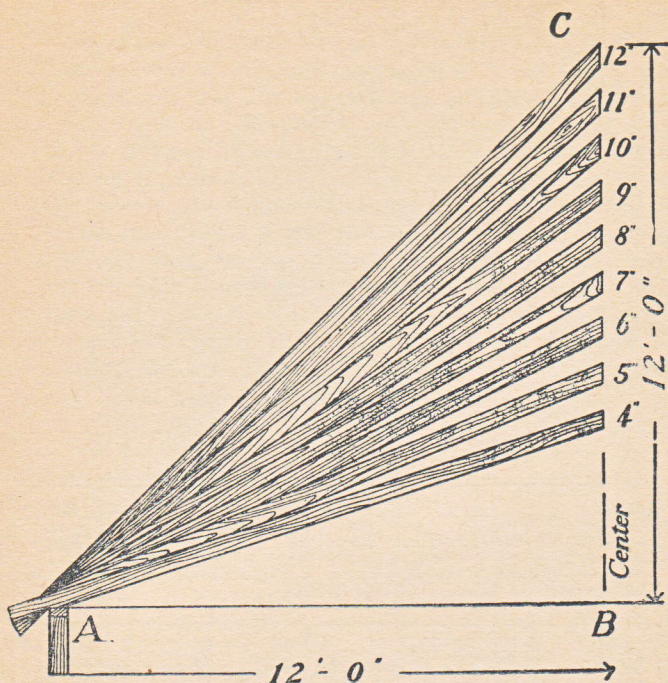


Fig. 2, Rafter Pitches.

RAFTER TABLE

The following rafter table will give the length of common rafters and distance from plate line to point of rafter for building with a gable roof from 4 to 40 feet wide, or for a shed roof, from 2 to 20 feet wide; the figures given do not include projection of rafters for cornice.

The row of figures across the top, 4 in. to 12 in., show the rise or pitch of the rafters (see explanation of diagram Fig. 2); the row of figures at the left-hand margin (2 to 20 feet) shows one-half the width of building if a gable roof, or the full width if a shed roof; the set of figures in the squares under the heading "Length" indicate the length of the rafter (not including projection for cornice) for a certain width. The column of figures under the heading "Height" indicate the distance from the plate line to point of rafter for the various widths of building and pitch of rafters.

To ascertain the length and height of common rafters, take for example, a gable roof, width of building 26 feet, pitch or rise of rafter is 10 inches; $\frac{1}{2}$ the width of building is 13 ft.; refer to column of figures at left hand margin (13), follow row of figures to right until you come to the two rows of figures directly under section (10 in. at the top) you will find in column under heading of "Length" 16 ft. 10 $\frac{10}{12}$ in., which gives the correct length of rafters, and in the next column under the heading of "Height," you will find 10 ft. 10 in., which indicates distance from plate line to point (top) of rafter. Length of all rafters in the table shown on following page does not include rafter projection for cornice.

PITCH TABLE

(For 12 foot Run)

Pitch	1/6	1/4	1/3	5/12	1/2	5/8	3/4
Run	12	12	12	12	12	12	12
Rise	4	6	8	10	12	15	18

COMMON RAFTER TABLE.

Giving length and height of rafters for various widths and pitches. Figures across top, 4 to 12 inclusive, indicate the pitch; figures at extreme left indicate half the width, if a gable roof; all figures under heading LENGTH give length of rafter; all figures under heading HEIGHT indicate the distance in feet and inches from plate line to the point of rafter.

	Pitch 4°		5°		6°		7°		8°		9°		10°		11°		12°	
	Length	H'ght	Length	H'ght	Length	H'ght	Length	H'ght	Length	H'ght	Length	H'ght	Length	H'ght	Length	H'ght	Length	H'ght
2	2'-1 $\frac{1}{2}$ "	0' 8"	2'-2"	0'-10"	2'-10 $\frac{1}{2}$ "	1'-3"	2'-3 $\frac{1}{2}$ "	1'-2"	2'-4 $\frac{1}{2}$ "	1'-4"	2'-6"	1'-5"	2'-7 $\frac{1}{2}$ "	1'-8"	2'-8 $\frac{1}{2}$ "	1'-10	2'-10"	2'-0"
3	3-1 $\frac{1}{2}$ "	1-0	3-2 $\frac{1}{2}$ "	1-3	3-4 $\frac{1}{2}$ "	1-6	3-5 $\frac{1}{2}$ "	1-9	3-7 $\frac{1}{2}$ "	2-0	3-9	2-3	3-10 $\frac{1}{2}$ "	2-6	4-1 $\frac{1}{2}$ "	2-9	4-2 $\frac{3}{4}$ "	3-0
4	4-2 $\frac{1}{2}$ "	1-4	4-3 $\frac{1}{2}$ "	1-8	4-5 $\frac{1}{2}$ "	2-0	4-7 $\frac{1}{2}$ "	2-4	4-9 $\frac{1}{2}$ "	2-8	5-0	3-0	5-2 $\frac{1}{2}$ "	3-4	5-5 $\frac{1}{2}$ "	3-8	5-7 $\frac{1}{2}$ "	4-0
5	5-3	1-8	5-4 $\frac{1}{2}$ "	2-1	5-7 $\frac{1}{2}$ "	2-6	5-9 $\frac{1}{2}$ "	2-11	6-0	3-4	6-3	3-9	6-6	4-2	6-9 $\frac{1}{2}$ "	4-7	7- $\frac{1}{2}$ "	5-0
6	6'-3 $\frac{1}{2}$ "	2-0	6'-5 $\frac{1}{2}$ "	2-6	6'-8 $\frac{1}{2}$ "	3-0	6'-2 $\frac{1}{2}$ "	3-6	7'-2 $\frac{1}{2}$ "	4-0	7'-6"	4-6	7'-9 $\frac{1}{2}$ "	5-0	8'-1 $\frac{1}{2}$ "	5-6	8'-5 $\frac{1}{2}$ "	6-0
7	7-4 $\frac{1}{2}$ "	2-4	7-5 $\frac{1}{2}$ "	2-11	7-10	3-6	8-1 $\frac{1}{2}$ "	4-1	8-4 $\frac{1}{2}$ "	4-8	8-9	5-3	9-1 $\frac{1}{2}$ "	5-10	9-6 $\frac{1}{2}$ "	6-5	9-10 $\frac{1}{2}$ "	7-0
8	8-4 $\frac{1}{2}$ "	2-8	8-7 $\frac{1}{2}$ "	3-4	8-11 $\frac{1}{2}$ "	4-0	9-3 $\frac{1}{2}$ "	4-8	9-7 $\frac{1}{2}$ "	5-4	10-0	6-0	10-4 $\frac{1}{2}$ "	6-8	10-10 $\frac{1}{2}$ "	7-4	11-3 $\frac{1}{2}$ "	8-0
9	9-5 $\frac{1}{2}$ "	3-0	9-8 $\frac{1}{2}$ "	3-9	10-1 $\frac{1}{2}$ "	4-6	10-5 $\frac{1}{2}$ "	5-3	10-9 $\frac{1}{2}$ "	6-0	11-3	6-9	11-8 $\frac{1}{2}$ "	7-6	12-2 $\frac{1}{2}$ "	8-3	12-8 $\frac{1}{2}$ "	9-0
10	10'-6"	3-4	10'-9 $\frac{1}{2}$ "	4-2	11'-2 $\frac{1}{2}$ "	5-0	11'-7 $\frac{1}{2}$ "	5-10	12'-0"	6-8	12'-6"	7-6	13'-0"	8-4	13'-7 $\frac{1}{2}$ "	9-2	14'-1 $\frac{1}{2}$ "	10-0
11	11-6 $\frac{1}{2}$ "	3-8	11-10 $\frac{1}{2}$ "	4-7	12-3 $\frac{1}{2}$ "	5-6	12-9	6-5	13-1 $\frac{1}{2}$ "	7-4	13-9	8-3	14-3 $\frac{1}{2}$ "	9-2	14-11 $\frac{1}{2}$ "	10-1	15-6 $\frac{1}{2}$ "	11-0
12	12-7 $\frac{1}{2}$ "	4-0	12-11 $\frac{1}{2}$ "	5-0	13-5 $\frac{1}{2}$ "	6-0	13-11	7-0	14-4 $\frac{1}{2}$ "	8-0	15-0	9-0	15-7 $\frac{1}{2}$ "	10-0	16-3 $\frac{1}{2}$ "	11-0	16-11 $\frac{1}{2}$ "	12-0
13	13-7 $\frac{1}{2}$ "	4-4	14-	5-5	14-6 $\frac{1}{2}$ "	6-6	15-1	7-7	15-7 $\frac{1}{2}$ "	8-8	16-3	9-9	16-10 $\frac{1}{2}$ "	10-10	17-8 $\frac{1}{2}$ "	11-11	18-4	13-0
14	14'-8 $\frac{1}{2}$ "	4-8	15'-1 $\frac{1}{2}$ "	5-10	15'-8 $\frac{1}{2}$ "	7-0	16'-2 $\frac{1}{2}$ "	8-2	16'-9 $\frac{1}{2}$ "	9-4	17'-6"	10-6	18'-2 $\frac{1}{2}$ "	11-8	19'- $\frac{1}{2}$ "	12-10	19'-8 $\frac{1}{2}$ "	14-0
15	15-9	5-0	16-2 $\frac{1}{2}$ "	6-3	16-9 $\frac{1}{2}$ "	7-6	17-4 $\frac{1}{2}$ "	8-9	18-0	10-0	18-9	11-3	19-6	12-6	20-4 $\frac{1}{2}$ "	13-9	21-1 $\frac{1}{2}$ "	15-0
16	16-9 $\frac{1}{2}$ "	5-4	17-3 $\frac{1}{2}$ "	6-8	17-11	8-0	18-6 $\frac{1}{2}$ "	9-4	19-2 $\frac{1}{2}$ "	10-8	20-0	12-0	20-9 $\frac{1}{2}$ "	13-4	21-9 $\frac{1}{2}$ "	14-8	22-6 $\frac{1}{2}$ "	16-0
17	17-10 $\frac{1}{2}$ "	5-8	18-4 $\frac{1}{2}$ "	7-1	19- $\frac{1}{2}$ "	8-6	19-8 $\frac{1}{2}$ "	9-11	20-4 $\frac{1}{2}$ "	11-4	21-3	12-9	22-1 $\frac{1}{2}$ "	14-2	23-1 $\frac{1}{2}$ "	15-7	23-11 $\frac{1}{2}$ "	17-0
18	18'-10 $\frac{1}{2}$ "	6-0	19'-5 $\frac{1}{2}$ "	7-6	20'-11 $\frac{1}{2}$ "	9-0	20'-10 $\frac{1}{2}$ "	10-6	21'-7 $\frac{1}{2}$ "	12-0	22'-6"	13-6	23'-4 $\frac{1}{2}$ "	15-0	24'-5 $\frac{1}{2}$ "	16-6	25-4 $\frac{1}{2}$ "	18-0
19	19-11 $\frac{1}{2}$ "	6-4	20-6 $\frac{1}{2}$ "	7-11	21-3 $\frac{1}{2}$ "	9-6	22- $\frac{1}{2}$ "	11-1	22-9 $\frac{1}{2}$ "	12-8	23-9	14-3	24-8 $\frac{1}{2}$ "	15-10	26-10	17-5	26-9 $\frac{1}{2}$ "	19-0
20	21-0	6-8	21-7 $\frac{1}{2}$ "	8-4	22-4 $\frac{1}{2}$ "	10-0	23-2 $\frac{1}{2}$ "	11-8	24-0	13-4	25-0	15-0	26-0	16-8	27-2 $\frac{1}{2}$ "	18-4	28-2 $\frac{1}{2}$ "	20-0

WIDTH OF BUILDING IN FEET

TABLE FOR FRAMING HIP AND VALLEY ROOFS

Pitch or Rise of Rafter	Length of Common Rafter to 1 ft. of Span	Length of Hip or Valley to 1 ft. of Span	Cut for Common Rafter	Cut for Hip or Valley	Bevel for Jack Rafters
4" to 1 ft.	1.05 ft.	1.45 ft.	4 & 12"	4 & 17"	* 12-1/2 & 12"
5" to 1 ft.	1.08 ft.	1.48 ft.	5 & 12"	5 & 17"	* 13 & 12"
6" to 1 ft.	1.12 ft.	1.50 ft.	6 & 12"	6 & 17"	* 14-1/2 & 12"
7" to 1 ft.	1.16 ft.	1.53 ft.	7 & 12"	7 & 17"	* 14 & 12"
8" to 1 ft.	1.20 ft.	1.56 ft.	8 & 12"	8 & 17"	* 14-1/2 & 12"
9" to 1 ft.	1.25 ft.	1.60 ft.	9 & 12"	9 & 17"	* 15 & 12"
10" to 1 ft.	1.30 ft.	1.64 ft.	10 & 12"	10 & 17"	* 15-7/8 & 12"
11" to 1 ft.	1.36 ft.	1.69 ft.	11 & 12"	11 & 17"	* 16-1/2 & 12"
12" to 1 ft.	1.41 ft.	1.73 ft.	12 & 12"	12 & 17"	* 17 & 12"

Table A.

Note—In the foregoing table no allowance is made for rafter projections.

Reducing Decimal Feet to Twelfths

By referring to the above rafter table, the length of rafters for 1 foot span is in feet and decimals of a foot. To reduce the decimal part to inches and twelfths of an inch, note the following example:

To find the length of common rafters for span of 9 ft. 6 in., with a pitch of 9 in. to 1 foot. In the foregoing table we find the length of common rafter for one foot of span at 9 in. is 1.25 ft.; multiplying 1.25 ft. by 9 ft. 6 in. (or 9.5 decimal feet) equals 11.875 ft.

The down cut at the top end of jack rafter and cuts at the plate line are the same as for common rafters, 9 in. and 12 in.; the bevels across the top end of jack rafter to fit the hip as at A, to be cut as shown, using figures from Table A (15 in. and 12 in.) marking across stick on 15 in. side. See diagram No. 1.

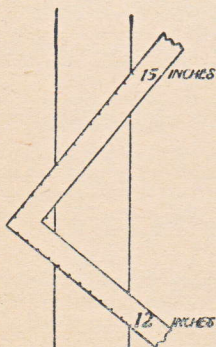


Diagram No. 1.

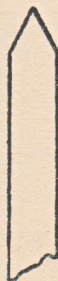
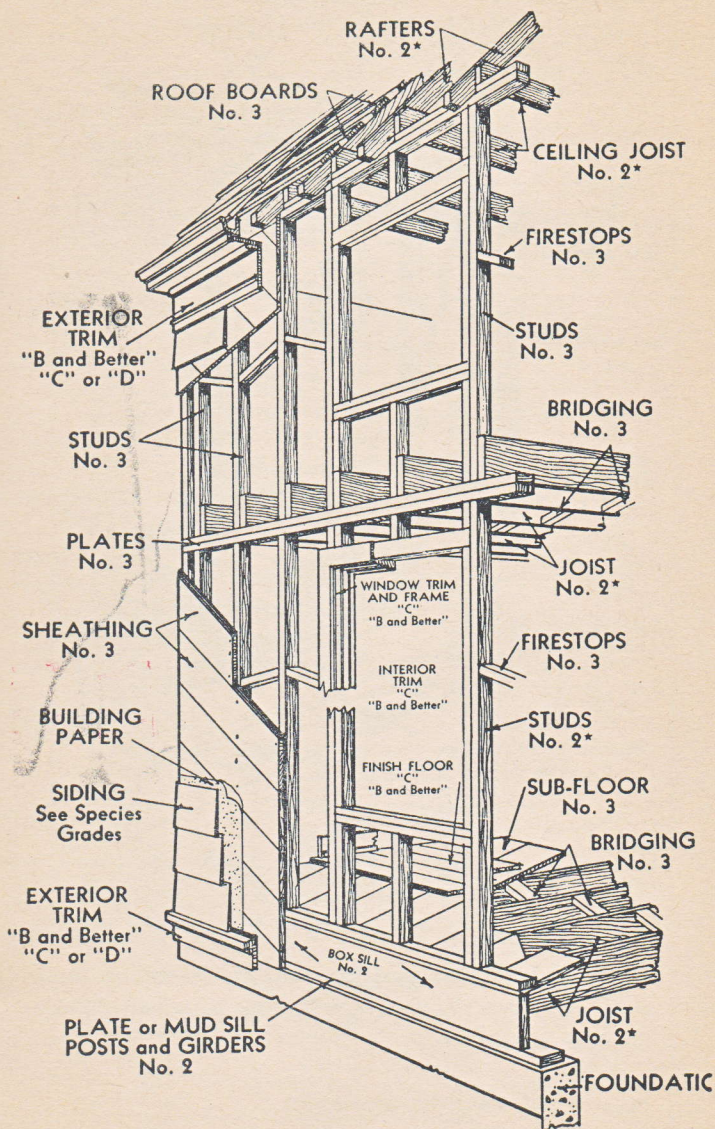


Diagram No. 2.

If hips or valleys are not backed, which is not necessary in ordinary framing, use the same cut, 15 and 12, for the top end of hip and valley rafter, but cutting both sides of hip as shown in diagram No. 2.

In cutting jack rafters make allowance for one-half the thickness of the hip rafters.

GRADE GUIDE FOR SOUND ECONOMICAL CONSTRUCTION



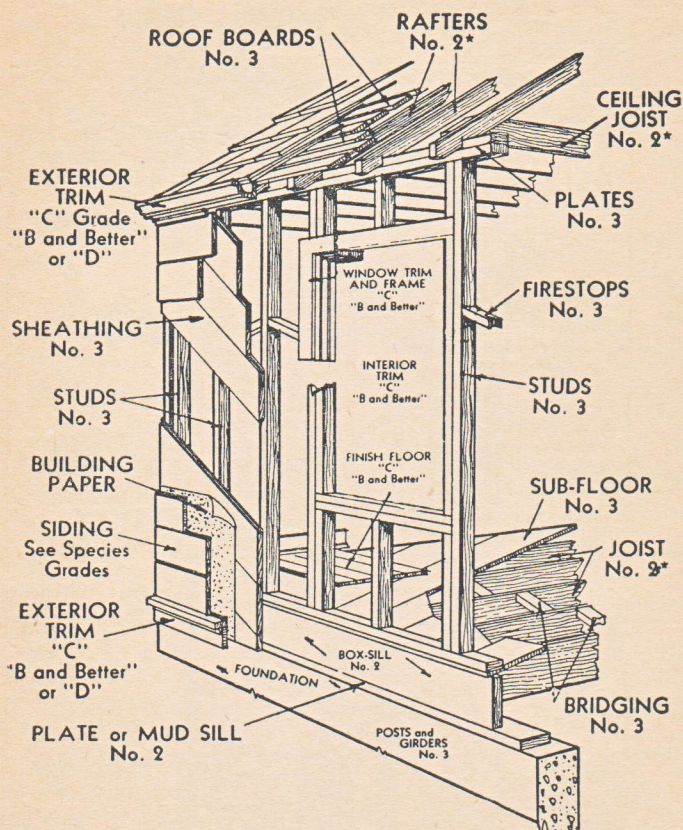
Note—SHEATHING

Courtesy West Coast Lumber Men's Association.

Diagonal sheathing is much stiffer and stronger than horizontal sheathing with braces, but it requires more material. No. 3 is amply strong, and economical, in both types.

*Where long lengths or unusual strength requirements indicate, use one grade higher.

GRADE GUIDE FOR SOUND AND ECONOMICAL CONSTRUCTION



Courtesy West Coast Lumber Men's Association.

Note — STUDS

No. 3 Studs may be used for walls and partitions in one-story structures; and for non-bearing or minor partitions in other structures.

Note — JOISTS AND RAFTERS

No. 2 Joists and Rafters can be used conservatively on spans not exceeding three-fourths the maximum allowable span for No. 1 Joists and Rafters of the same thickness and depth. For example, in a dwelling or apartment house with live load of 40 pounds per square foot, 2-inch No. 1 Joists, 16 inches on centers, can be used safely on a span in feet equal to $1\frac{1}{2}$ times their nominal depth in inches; 2-inch No. 2 Joists, 16 inches on centers, on a span in feet slightly more than their normal depth in inches; e.g., 2x10 No. 1 on a span of 15 feet, 2x10 No. 2 on a span of eleven feet, three inches.

COLORS-IN-OIL TO USE FOR MIXING VARIOUS COLORS

To produce commonly used tints, add to the gallons of ready-to-use white paint indicated, the measures of paste colors-in-oil shown below:

To Produce Tints of	For 1 Gal.	For 2 Gal.	For 3 Gal.	For 5 Gal.
LIGHT YELLOW Med. Chrome Yellow	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
OYSTER WHITE Raw Turkey Umber	1 Teas.	1¾ Teas.	2½ Teas.	4¼ Teas.
PUTTY COLOR Raw Turkey Umber	3½ Teas.	2½ Tbls.	3½ Tbls.	6 Tbls.
LIGHT IVORY Raw Italian Sienna	2¾ Teas.	5¼ Teas.	2¾ Tbls.	4½ Tbls.
CORNSTALK YELLOW Raw Italian Sienna Raw Turkey Umber	3½ Teas. 1 Teas.	2½ Tbls. 1¾ Teas.	3½ Tbls. 2½ Teas.	6 Tbls. 4¼ Teas.
PEACH C. P. Orange Chrome Yellow	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
LILAC Rose Lake	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
SHELL PINK English Venetian Red	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
TURQUOISE C. P. Dark Chrome Green	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
LIGHT GREEN C. P. Medium Chrome Green	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
PISTACHIO C. P. Light Chrome Green	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
SILVER GRAY Lampblack	1 Teas.	1¾ Teas.	2½ Teas.	4¼ Teas.
DULL ROSE English Venetian Red Burnt Turkey Umber	5 Teas. 3½ Teas.	3½ Tbls. 2½ Tbls.	5 Tbls. 3 Tbls.	8½ Tbls. 6 Tbls.
ARTICHOKE GREEN C. P. Dark Chrome Green Raw Turkey Umber	3½ Teas. 6 Tbls.	2½ Tbls. 12 Tbls.	3½ Tbls. ½ pint	6 Tbls. ¾ pint
POWDER BLUE Lampblack Prussian Blue	3½ Teas. 1 Teas.	2½ Tbls. 1¾ Teas.	3½ Tbls. 2½ Teas.	6 Tbls. 4¼ Teas.
DULL WINE Indian Red English Venetian Red	¾ pint 3½ Tbls.	½ pint 7 Tbls.	¾ pint 10½ Tbls.	1¼ pint ½ pint
RODDISH GRAY English Venetian Red Lampblack	2¼ Tbls. 4 Teas.	4½ Tbls. 2¾ Tbls.	7 Tbls. 4 Tbls.	11½ Tbls. 6¾ Tbls.

HOW TO MIX PAINTS

Buff	—White, yellow ochre and red.
Chestnut	—Red, black and yellow.
Chocolate	—Raw umber, red and black.
Claret	—Red, umber and black.
Copper	—Red, yellow and black.
Dove	—White, vermilion, blue and yellow.
Drab	—White, yellow ochre, red and black.
Fawn	—White, yellow and red.
Flesh	—White, yellow ochre and vermilion.
Freestone	—Red, black, yellow ochre and white.
French Grey	—White, Prussian blue and lake.
Grey	—White lead and black.
Gold	—White, stone ochre and red.
Green Bronze	—Chrome green, black and yellow.
Green Pea	—White and chrome green.
Lemon	—White and chrome yellow.
Limestone	—White, yellow ochre, black and red.
Olive	—Yellow, blue, black and white.
Orange	—Yellow and red.
Peach	—White and vermilion.
Pearl	—White, black and blue.
Pink	—White, vermilion and lake.
Purple	—Violet, with more red and white.
Rose	—White and madder lake.
Violet	—Red, blue and white.

The first named color is the principal ingredient; the others follow in the order of their importance. Exact proportions of each color must be determined by experiment with a smaller quantity. It is best to have the principal ingredient thick and the others thin when mixing.

ESTIMATE FORM

Type of Building.....

Bid Contract Price.....

DateCompleted

Est. Cost

Surveying Lot
 Excavating Cu. yds. @.....
 Footings Cu. yds. @.....
 Walls Cu. feet @.....
 Walls, Block Surf. ft. @.....
 Walls, Brick Surf. ft. @.....
 Water proofing @.....
 Cement work Sq. ft.
 Chimneys Lin. ft. @.....
 Flue lining Lin ft. @.....
 Cistern bbl. Cap. @.....
 Blocks or Bricks, Com..... @.....
 Brick, Face @.....
 Lime Sacks @.....
 Mort. Color..... Lbs. @.....
 Sand Yds. @.....
 Crushed Stone or Gravel.....
 Stone, Rubble..... Perch. @.....
 Stone, Cut ft @.....
 Tile Terra Cotta.....
 Mason Labor
 Lumber (see Itemized List).....
 Mill Work
 Tile, Floors @.....
 Linoleum @.....
 Drain Tile @.....
 Hardware, Rough (see List).....
 Hardware, Finish (see List).....
 Metal Work (see List).....
 Painting and Glazing.....
 Lathing
 Plastering
 Plastering, Outside
 Roof, Squares @.....
 Mantel and Grate.....
 Electrical Work
 Electric Fixtures
 Carpenter Labor
 Iron Work
 Plb., Sewer, Water, Gas Fixt.....
 Heating
 Ventilation
 Grading
 Landscaping
 Power and Fuel.....
 Cartage
 Permits
 Bonds
 Insurance
 St. Paving Repair.....
 Incidentals
 Totals.....

NAME _____, 19____

FINAL
SUB-CONTRACT
or Purchase Price

ACTUAL COST
(Cost at time of
completion)

PAY ROLL
Week ending
19.....

CARPEN-
TER
LABOR

MASON
LABOR

Total Cost
of Labor

Date
19.....

CASH RECEIVED ON JOB

By Cash

" "

" "

" "

" "

" "

" "

" "

" "

" "

Total Sum
Received on Job

Total Cost

Profit on Job

Loss on Job

Extras on Job

DAYS FOR ONE MAN TO COMPLETE

Carpenter Labor

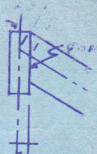
Days

Mason Labor

Days

LUMBER READY RECKONER.

SIZES IN INCHES	LENGTH IN FEET											
	10	12	14	16	18	20	22	24	26	28	30	32
1 x 2.....	1 $\frac{2}{3}$	2	2 $\frac{1}{3}$	2 $\frac{2}{3}$	3	3 $\frac{1}{3}$	.....	.....	.....	.....	.....	.....
1 x 3.....	2 $\frac{1}{3}$	3	3 $\frac{1}{3}$	4	4 $\frac{1}{2}$	5	.....	.....	.....	.....	.....	.....
1 x 4.....	3 $\frac{1}{3}$	4	4 $\frac{2}{3}$	5 $\frac{1}{3}$	6	6 $\frac{2}{3}$	.....	.....	.....	.....	.....	.....
1 x 6.....	5	6	7	8	9	10	.....	.....	.....	.....	.....	.....
1 x 8.....	6 $\frac{2}{3}$	8	9 $\frac{1}{3}$	10 $\frac{1}{3}$	12	13 $\frac{1}{3}$	.....	.....	.....	.....	.....	.....
1 x 10.....	8 $\frac{1}{3}$	10	11 $\frac{2}{3}$	13 $\frac{1}{3}$	15	16 $\frac{2}{3}$	.....	.....	.....	.....	.....	.....
1 x 12.....	10	12	14	16	18	20	.....	.....	.....	.....	.....	.....
1 x 14.....	11 $\frac{2}{3}$	14	16 $\frac{1}{3}$	18 $\frac{2}{3}$	22 $\frac{2}{3}$	23 $\frac{1}{3}$	.....	.....	.....	.....	.....	.....
1 x 16.....	13 $\frac{1}{3}$	16	18 $\frac{2}{3}$	21 $\frac{1}{3}$	24	26 $\frac{2}{3}$	.....	.....	.....	.....	.....	.....
1 $\frac{1}{4}$ x 4.....	4 $\frac{1}{6}$	5	5 $\frac{5}{6}$	6 $\frac{2}{3}$	.....	.....	.....	.....	.....	.....	.....	.....
1 $\frac{1}{4}$ x 6.....	6 $\frac{1}{3}$	7 $\frac{1}{2}$	8 $\frac{1}{3}$	10	.....	.....	.....	.....	.....	.....	.....	.....
1 $\frac{1}{4}$ x 8.....	8 $\frac{1}{3}$	10	11 $\frac{2}{3}$	13 $\frac{1}{3}$	.....	.....	.....	.....	.....	.....	.....	.....
1 $\frac{1}{4}$ x 10.....	10 $\frac{5}{12}$	12 $\frac{1}{2}$	14 $\frac{7}{12}$	16 $\frac{2}{3}$	.....	.....	.....	.....	.....	.....	.....	.....
1 $\frac{1}{4}$ x 12.....	12 $\frac{1}{2}$	15	17 $\frac{1}{2}$	20	.....	.....	.....	.....	.....	.....	.....	.....
1 $\frac{1}{2}$ x 4.....	5	6	7	8	.....	.....	.....	.....	.....	.....	.....	.....
1 $\frac{1}{2}$ x 6.....	7 $\frac{1}{2}$	9	10 $\frac{1}{2}$	12	.....	.....	.....	.....	.....	.....	.....	.....
1 $\frac{1}{2}$ x 8.....	10	12	14	16	.....	.....	.....	.....	.....	.....	.....	.....
1 $\frac{1}{2}$ x 10.....	12 $\frac{1}{2}$	15	17 $\frac{1}{2}$	20	.....	.....	.....	.....	.....	.....	.....	.....
1 $\frac{1}{2}$ x 12.....	15	18	21	24	.....	.....	.....	.....	.....	.....	.....	.....
2 x 4.....	6 $\frac{2}{3}$	8	9 $\frac{1}{3}$	10 $\frac{2}{3}$	12	13 $\frac{1}{3}$	14 $\frac{2}{3}$	16	17 $\frac{1}{3}$	18 $\frac{2}{3}$	20	21 $\frac{1}{3}$
2 x 6.....	10	12	14	16	18	20	22	24	26	28	30	32
2 x 8.....	13 $\frac{1}{3}$	16	18 $\frac{2}{3}$	21 $\frac{1}{3}$	24	26 $\frac{2}{3}$	29 $\frac{1}{3}$	32	34 $\frac{2}{3}$	37 $\frac{1}{3}$	40	42 $\frac{2}{3}$
2 x 10.....	16 $\frac{2}{3}$	20	23 $\frac{1}{3}$	26 $\frac{2}{3}$	30	33 $\frac{1}{3}$	36 $\frac{2}{3}$	40	43 $\frac{1}{3}$	46 $\frac{2}{3}$	50	53 $\frac{1}{3}$
2 x 12.....	20	24	28	32	36	40	44	48	52	56	60	64
2 x 14.....	23 $\frac{1}{3}$	28	32 $\frac{2}{3}$	37 $\frac{1}{3}$	42	46 $\frac{2}{3}$	51 $\frac{1}{3}$	56	60 $\frac{2}{3}$	65 $\frac{1}{3}$	70	74 $\frac{2}{3}$
2 x 16.....	26 $\frac{2}{3}$	32	37 $\frac{1}{3}$	42 $\frac{2}{3}$	48	53 $\frac{1}{3}$	58 $\frac{2}{3}$	64	69 $\frac{1}{3}$	74 $\frac{2}{3}$	80	85 $\frac{1}{3}$
2 $\frac{1}{2}$ x 12.....	25	30	35	40	45	50	55	60	65	70	75	80
2 $\frac{1}{2}$ x 14.....	29 $\frac{1}{6}$	35	40 $\frac{5}{6}$	46 $\frac{2}{3}$	52 $\frac{1}{2}$	58 $\frac{1}{3}$	64 $\frac{1}{6}$	70	75 $\frac{5}{6}$	81 $\frac{2}{3}$	87 $\frac{1}{2}$	93 $\frac{1}{3}$
2 $\frac{1}{2}$ x 16.....	33 $\frac{1}{3}$	40	46 $\frac{2}{3}$	53 $\frac{1}{3}$	60	66 $\frac{2}{3}$	73 $\frac{1}{3}$	80	86 $\frac{2}{3}$	93 $\frac{1}{3}$	100	106 $\frac{2}{3}$
3 x 6.....	15	18	21	24	27	30	33	36	39	42	45	48
3 x 8.....	20	24	28	32	36	40	44	48	52	56	60	64
3 x 10.....	25	30	35	40	45	50	55	60	65	70	75	80
3 x 12.....	30	36	42	48	54	60	66	72	78	84	90	96
3 x 14.....	35	42	49	56	63	70	77	84	91	98	105	112
3 x 16.....	40	48	56	64	72	80	88	96	104	112	120	128
4 x 4.....	13 $\frac{1}{3}$	16	18 $\frac{2}{3}$	21 $\frac{1}{3}$	24	26 $\frac{2}{3}$	29 $\frac{1}{3}$	32	34 $\frac{2}{3}$	37 $\frac{1}{3}$	40	42 $\frac{2}{3}$
4 x 6.....	20	24	28	32	36	40	44	48	52	56	60	64
4 x 8.....	26 $\frac{2}{3}$	32	37 $\frac{1}{3}$	42 $\frac{2}{3}$	48	53 $\frac{1}{3}$	58 $\frac{2}{3}$	64	69 $\frac{1}{3}$	74 $\frac{2}{3}$	80	85 $\frac{1}{3}$
4 x 10.....	33 $\frac{1}{3}$	40	46 $\frac{2}{3}$	53 $\frac{1}{3}$	60	66 $\frac{2}{3}$	73 $\frac{1}{3}$	80	86 $\frac{2}{3}$	93 $\frac{1}{3}$	100	106 $\frac{2}{3}$
4 x 12.....	40	48	56	64	72	80	88	96	104	112	120	128
4 x 14.....	46 $\frac{2}{3}$	56	65 $\frac{1}{3}$	74 $\frac{2}{3}$	84	93 $\frac{1}{3}$	102 $\frac{2}{3}$	112	121 $\frac{1}{3}$	130 $\frac{2}{3}$	140	149 $\frac{1}{3}$
6 x 6.....	30	36	42	48	54	60	66	72	78	84	90	96
6 x 8.....	40	48	56	64	72	80	88	96	104	112	120	128
6 x 10.....	50	60	70	80	90	100	110	120	130	140	150	160
6 x 12.....	60	72	84	96	108	120	132	144	156	168	180	196
6 x 14.....	70	84	98	112	126	140	154	168	182	196	210	224
6 x 16.....	80	96	112	128	144	160	176	192	208	224	240	256
8 x 8.....	53 $\frac{1}{3}$	64	74 $\frac{2}{3}$	85 $\frac{1}{3}$	96	106 $\frac{2}{3}$	117 $\frac{1}{3}$	128	138 $\frac{2}{3}$	149 $\frac{1}{3}$	160	170 $\frac{2}{3}$
8 x 10.....	66 $\frac{2}{3}$	80	93 $\frac{1}{3}$	106 $\frac{2}{3}$	120	133 $\frac{1}{3}$	146 $\frac{2}{3}$	160	173 $\frac{1}{3}$	186 $\frac{2}{3}$	200	213 $\frac{1}{3}$
8 x 12.....	80	96	112	128	144	160	176	192	208	224	240	256
8 x 14.....	93 $\frac{1}{3}$	112	130 $\frac{2}{3}$	149 $\frac{1}{3}$	168	186 $\frac{2}{3}$	205 $\frac{1}{3}$	224	242 $\frac{2}{3}$	261 $\frac{1}{3}$	280	298 $\frac{2}{3}$
10 x 10.....	83 $\frac{1}{3}$	100	116 $\frac{2}{3}$	133 $\frac{1}{3}$	150	166 $\frac{2}{3}$	183 $\frac{1}{3}$	200	216 $\frac{2}{3}$	233 $\frac{1}{3}$	250	266 $\frac{2}{3}$
10 x 12.....	100	120	140	160	180	200	220	240	260	280	300	320
10 x 14.....	116 $\frac{2}{3}$	140	163 $\frac{1}{3}$	186 $\frac{2}{3}$	210	233 $\frac{1}{3}$	256 $\frac{2}{3}$	280	303 $\frac{1}{3}$	326 $\frac{2}{3}$	350	373 $\frac{1}{3}$
10 x 16.....	133 $\frac{1}{3}$	160	186 $\frac{2}{3}$	213 $\frac{1}{3}$	240	266 $\frac{2}{3}$	293 $\frac{1}{3}$	320	346 $\frac{2}{3}$	373 $\frac{1}{3}$	400	426 $\frac{2}{3}$
12 x 12.....	120	144	168	192	216	240	264	288	312	336	360	384
12 x 14.....	140	168	196	224	252	280	308	336	364	392	420	448
12 x 16.....	160	192	224	256	288	320	352	384	416	448	480	512
14 x 14.....	163 $\frac{1}{3}$	196	228 $\frac{2}{3}$	261 $\frac{1}{3}$	294	326 $\frac{2}{3}$	359 $\frac{1}{3}$	392	424 $\frac{2}{3}$	457 $\frac{1}{3}$	490	522 $\frac{2}{3}$
14 x 16.....	186 $\frac{2}{3}$	224	261 $\frac{1}{3}$	298 $\frac{2}{3}$	336	373 $\frac{1}{3}$	410 $\frac{2}{3}$	448	485 $\frac{1}{3}$	522 $\frac{2}{3}$	560	597 $\frac{1}{3}$



HALF
OF RID.

